

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
2 June 2005 (02.06.2005)

PCT

(10) International Publication Number
WO 2005/049421 A2

(51) International Patent Classification⁷: **B64C**

(21) International Application Number:
PCT/US2004/027990

(22) International Filing Date: 27 August 2004 (27.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/498,073 27 August 2003 (27.08.2003) US

(71) Applicant (for all designated States except US): **BELL HELICOPTER TEXTRON INC. [US/US]; P.O. Box 482, Fort Worth, TX 76101 (US).**

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STAMPS, Frank, B. [US/US]; 4705 Mill Crossing West, Colleyville, TX 76034 (US). SMITH, Michael, R. [US/US]; 1700 Tyler,**

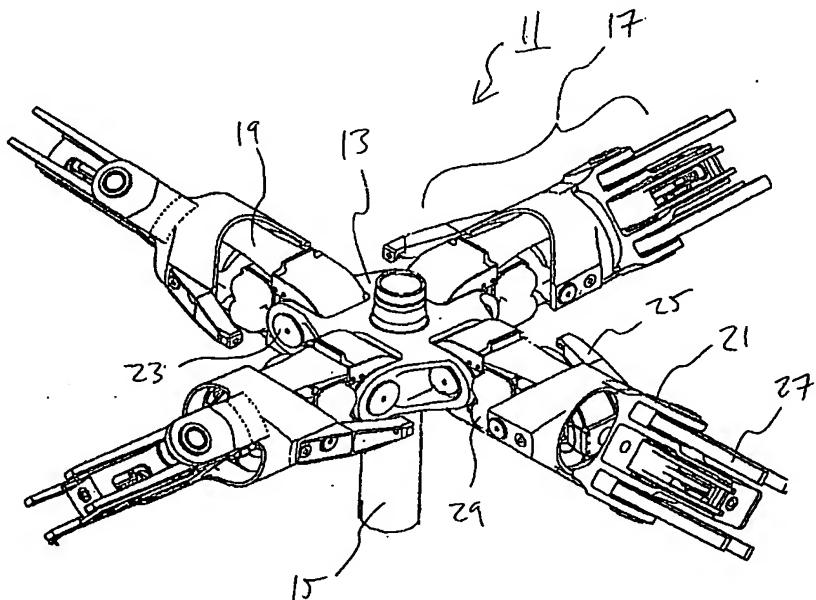
Colleyville, TX 76034 (US). **BOTHWELL, Christopher, M. [US/US]; 512 Coventry Drive, Grapevine, TX 76051 (US). CORSO, Lawrence, M. [US/US]; 9204 Glenhaven Court, North Richland Hills, TX 76180 (US). BRASWELL, James, L., Jr. [US/US]; 106 Williamsburg Court, Colleyville, TX 76034 (US). POPELKA, David, A. [US/US]; 4705 Mill Brook, Colleyville, TX 76034 (US). SCHELLHASE, Ernst, C. [US/US]; 8516 Marys Creek Drive, Fort Worth, TX 76116 (US). HOLLIMON, Charles, L. [US/US]; 6836 Megan Lane, North Richland Hills, TX 76180 (US). NEWMAN, Thomas, J. [US/US]; 175 E.P. Dawson Road, Maypearl, TX 76064 (US). BASKIN, Bryan [US/US]; 2804 Hedgeway Drive, Arlington, TX 76016 (US). CAMPBELL, Thomas, C. [US/US]; 5448 Lake Powell Drive, Fort Worth, TX 76137 (US). ROBERTSON, Daniel, B. [US/US]; 1222 Ridgewood Circle, Southlake, TX 76092 (US).**

(74) Agents: **WALTON, James, E. et al.; Law Offices of James E. Walton, P.L.L.C., Suite 107-328, 1169 N. Burleson Boulevard, Burleson, TX 76028 (US).**

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

[Continued on next page]

(54) Title: SOFT IN-PLANE ROTOR HUB



(57) Abstract: A rotor hub assembly for a rotary-wing aircraft has a central member and a plurality of blade grips adapted for attaching rotor blades to the central member. The blade grips are pivotally attached to the central member and are capable of pivoting about a pivot axis generally normal to a plane of rotation of the blades. The pivoting allows for in-plane motion of the blades relative to the central member. A damper is operably connected to each blade grip for damping the in-plane motion of the associated blade, each damper being selectively switchable between at least two spring rates.

WO 2005/049421 A2



AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
2 June 2005 (02.06.2005)

PCT

(10) International Publication Number
WO 2005/049421 A3

(51) International Patent Classification⁷: **B64C 27/51**

(21) International Application Number:
PCT/US2004/027990

(22) International Filing Date: 27 August 2004 (27.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/498,073 27 August 2003 (27.08.2003) US

(71) Applicant (for all designated States except US): **BELL HELICOPTER TEXTRON INC. [US/US]; P.O. Box 482, Fort Worth, TX 76101 (US).**

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STAMPS, Frank, B. [US/US]; 4705 Mill Crossing West, Colleyville, TX 76034 (US). SMITH, Michael, R. [US/US]; 1700 Tyler, Colleyville, TX 76034 (US). BOTHWELL, Christopher, M. [US/US]; 512 Coventry Drive, Grapevine, TX 76051 (US). CORSO, Lawrence, M. [US/US]; 9204 Glenhaven Court, North Richland Hills, TX 76180 (US).**

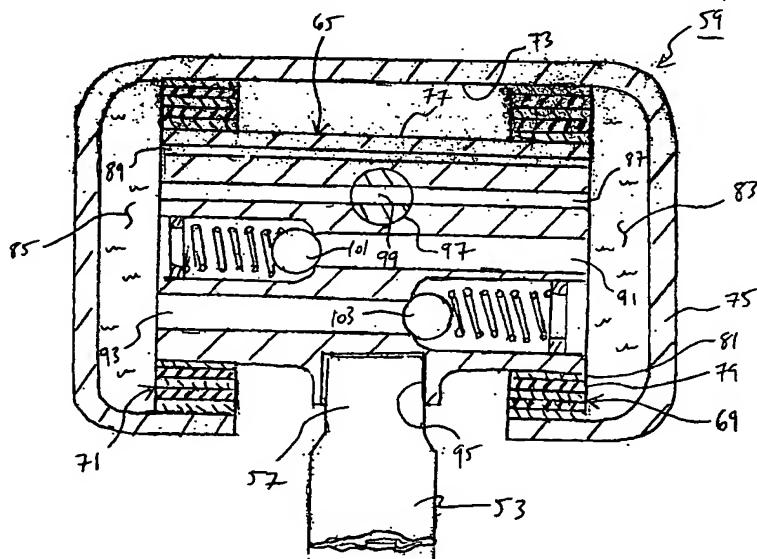
BRASWELL, James, L., Jr. [US/US]; 106 Williamsburg Court, Colleyville, TX 76034 (US). POPELKA, David, A. [US/US]; 4705 Mill Brook, Colleyville, TX 76034 (US). SCHELLHASE, Ernst, C. [US/US]; 8516 Marys Creek Drive, Fort Worth, TX 76116 (US). HOLLIMON, Charles, L. [US/US]; 6836 Megan Lane, North Richland Hills, TX 76180 (US). NEWMAN, Thomas, J. [US/US]; 175 E.P. Dawson Road, Maypearl, TX 76064 (US). BASKIN, Bryan [US/US]; 2804 Hedgeway Drive, Arlington, TX 76016 (US). CAMPBELL, Thomas, C. [US/US]; 5448 Lake Powell Drive, Fort Worth, TX 76137 (US). ROBERTSON, Daniel, B. [US/US]; 1222 Ridgewood Circle, Southlake, TX 76092 (US).

(74) Agents: **WALTON, James, E. et al.; Law Offices of James E. Walton, P.L.L.C., Suite 107-328, 1169 N. Burleson Boulevard, Burleson, TX 76028 (US).**

(81) Designated States (unless otherwise indicated, for every kind of national protection available): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,**

[Continued on next page]

(54) Title: SOFT IN-PLANE ROTOR HUB





PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) **Date of publication of the international search report:**
4 August 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.